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THE YUKON TERRITORY

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Yukon Territory

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A BRIEF PRESENTED TO THE ROYAL COMMISSION ON CANADA'S ECONOMIC PROSPECTS

by

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Commissioner of the Yukon Territory

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I. INTRODUCTION

More than half a century ago the world first came to know of the Yukon. The gold rush of 1898 assured a place for the territory in story and legend. More than this transient fame, however, gold brought people to the Yukon and opened the door to future development. The gold rush of 1898, like virtually all such romantic frontier episodes, was literally a flash in the pan. It left in its wake some personal fortunes, more disappointments, a sense of anti-climax. But the hopes that were born in those extravagant days were never lost, and on the fickle basis of this wild adventure were built the foundations of the Yukon's future. Since 1898 the territory has found new impetus for development. Gold has never been forgotten, but beside it, and now eclipsing it, other minerals have been discovered and taken. The pans of the early prospectors have given way to the panoply of modern mining whose operations, if less romantic than in the early days, point to a future of security and confidence.

The Yukon's substantial population at the turn of the present century, more than 27,000 at the census of 1901, caused it to achieve during the first decade both representation in the House of Commons and a wholly elected Territorial Council sitting in the territory. With the marked decline in population that the Yukon experienced in succeeding decades, the number of members in the Territorial Council was reduced, but its fully elective character was retained throughout. The subsequent increase in population from about 5,000 in 1941 to about 9,000 in 1951 brought an enlargement in the Council from three to five members.

The administration of the Yukon rests with the Commissioner acting under instructions of the Minister of Northern Affairs and National Resources or, in the final analysis, of the Governor-in-Council. The principal difference between the powers of the Yukon's territorial government and those of provincial governments is that the Yukon does not own or administer its natural resources. These resources are vested in the government of Canada, as were those of the western provinces prior to 1930. Revenues are raised for territorial purposes by the Council of the Yukon through taxes of various types. The government does not, however, have any power to raise money by borrowing except on the authority of the Governor-in-Council.

This brief has as its objectives an assessment of the contribution that the natural resources of the Yukon Territory might make to the Canadian economy of the next quarter-century and an appraisal of the courses of action which appear to lie open for promoting the achievement of that contribution. It describes in turn the territory's natural resources, its population, and the economic development it has undergone; it then proceeds to assess the future prospects of the Yukon's mining industry and the problems facing future economic expansion. Lastly, it suggests how this economic expansion might be encouraged and why early action along certain lines appears to be justified.

The Yukon in the Canadian Economy

The Yukon Territory is as large as the Maritime Provinces and Newfoundland (including Labrador) combined. Its 207,000 square miles make up 5.4 per cent of the land and fresh water area of Canada. If there was a time when the territory's importance for the Canadian economy of the future was heavily discounted, that time should now be past. There are grounds for believing that the Yukon's potential is at least commensurate with its area, if not as a seat of population and of a highly diversified industrial society, then as a source of natural wealth and as the site of an associated industrial development. In the Yukon this country possesses, according to every available indication, a store of natural resources which in time should rank it among our major sources of mineral wealth.

That the development of these resources has so far been limited is explained by many factors: The impact of wars and depression, preoccupation with the economic expansion of southern Canada, lack of intimate knowledge of the Yukon's wealth, and the special problems facing its exploitation. If the future course of the Yukon economy cannot now be charted in even the broadest way, that is in good part because the detailed assessment of its mineral resources is yet hardly begun. That Canada's northern reaches can, however, quickly assume economic importance has been finding impressive illustration across the face of Canada. As a whole, the north has been making economic history more rapidly than Canadians could have expected or hoped before the Second World War. Indeed, the pace at which our economic frontier has been striking northward stands out as perhaps the most arresting feature of our recent economic progress. The dimensions of the contribution that the Yukon is capable of making to the expanding universe of the Canadian economy in the next quarter-century are to be judged by the nature and extent of its natural resources and by the development, as yet hardly begun, that these resources may be expected to undergo.

II. NATURAL RESOURCES

Mineral Resources

The economic expansion of the Yukon will depend largely upon the development and processing of its mineral resources, whose magnitude is witnessed by the territory's geological characteristics. Geologically the Yukon consists largely of the northward extension of the Cordilleras and their flanks. It thus forms a part of one of the two great metal-bearing regions of the North American continent, the other being the Precambrian Shield. Its central feature is the great Yukon Plateau, with smaller basins about the Liard River to the southeast and about the Porcupine River to the north. Separating and rimming these plateaus, and erupting into the relatively even surface of the Yukon Plateau, are mountains. Included among the mountains of the territory are the Coast, Selwyn, St. Elias and other ranges. It is the view of the Geological Survey of Canada that the Yukon's varied geology holds out promise of great mineral resources of wide range.

The progressive assessment of these resources is the principal key to the territory's economic expansion. The Geological Survey of Canada has now surveyed and prepared geological maps for about one-third of the Yukon. Much of this mapping will have to be redone as it is either exploratory or not up to modern requirements. Beginning about 1943 its tempo was quickened, and the objective now is to complete 4-mile mapping, to carry on special studies of interesting areas, and to study specific problems. Ahead lies the prospect that surveys by helicopter will hasten enormously the mapping process, as they have done in large areas of the Northwest Territories since 1952. Even when relatively large-scale, this geological mapping permits both reasonable appraisal of mineral resources and knowledgeable planning of future geological work.

While this assessment has proceeded, a start has been made on the more intensive exploration of the Yukon's mineral wealth by prospectors and mining companies. Until the second decade of this century it was the search for placer gold that drew the prospector; to other minerals he paid but scant attention. Upon the discovery, however, of high silver values in the lead-zinc veins of the Mayo district in central Yukon, a wave of prospecting arose directed toward the discovery of high-grade deposits. Nevertheless, it was not until after the Second World War that general prospecting with adequate capital developed. In recent years the Yukon's metals and other minerals have attracted the attention of some of the largest and most progressive companies in the Canadian mining industry. That this is so affords a notable indication of the view that responsible opinion takes of the Yukon's mining potential. In the location and assessment of the territory's wealth a large and growing contribution has been made by modern scientific methods, such as the use of the airborne magnetometer. This role of science may be expected to become rapidly more important.

The Yukon is still relatively unprospected. Already, however, enough is known to suggest that it may be the richest in minerals of the entire Cordilleran region. Lying in this same geological region, the Province of British Columbia now accounts for one-sixth by value of Canadian metals production, including four-fifths of our lead and two-fifths

of our zinc. Even now more than twenty-five different minerals have been discovered in the Yukon, and of these ten have been produced—gold, silver, lead, zinc, cadmium, copper, coal, tungsten, platinum and antimony. While the current search for minerals is ranging over much of the territory, it is concentrated particularly in the Pelly and St. Elias regions, which are especially promising geologically for base metals. The 30,000 square miles of the Pelly region, which stretches 500 miles from the Alaska Highway in the southeast to beyond Mayo in the north, look to be rich in lead-zinc-silver, of which several deposits have been proved and many unproved discoveries have been made throughout its area. In the St. Elias region it is copper and nickel that appear as the most likely prospects, although there are also coal and at least one large deposit of gypsum. That these areas are receiving the most attention arises in part from the fact that, lying within a radius of 300 miles of Whitehorse, they are relatively accessible by the Alaska Highway and other transportation routes. Elsewhere in the Yukon the Porcupine River basin, as yet little explored, appears likely to have oil as its chief resource, with perhaps some coal. The Liard region offers possibilities for these same two minerals.

What emerges from our present sparse knowledge of the territory's mineral wealth is the belief that this wealth may lie in store throughout the Yukon's length and breadth. Even now there is reason for thinking that in certain areas at least its concentration is unusually heavy. Not only is this so, but the presumption is strong that the variety of metals and other minerals is more than ordinarily wide. The Geological Survey of Canada has offered the summary conclusion that the territory is a *most promising* mineral region. The measurement of its resources must, however, take many years, since at present there is not one area whose wealth is intimately known. It is this close assessment, now hardly begun, that the future will achieve, thereby bringing into focus the promise of the Yukon.

Other Natural Resources

Set against its mineral potential, the territory's other natural resources—its fur-bearing animals, its arable lands, its forests, and its fisheries—are relatively small, and so is the importance that they can be expected to have for the economic development of the Yukon. In the Yukon River and certain of its tributaries, however, it possesses a waterpower potential which is likely to play an important role in the development of the Yukon's mineral wealth.

III. POPULATION AND ECONOMIC DEVELOPMENT

Population

The Yukon had at the census of 1951 a population of 9,096, of whom 7,533, or 83 per cent, were whites, 1,533 were Indians and 30 were Eskimos. Its principal centres, and its only incorporated municipalities, are Whitehorse and Dawson. For many years, Dawson, whose present population is 800, was the seat of government, but this was transferred in 1953 to Whitehorse for reasons of its larger population, now 2,600 excluding armed services, and its importance as a communication centre.

In the statistics of the territory's population, as recorded in the decennial censuses for the past half-century, is mirrored the course of the Yukon's economic development. In 1901, when the Klondike gold rush was already past its height, there were 27,000 persons resident in the territory, including a white population of 23,900. At that time, too, the 9,100 inhabitants of Dawson gave that city fourth rank among all municipalities west of Ontario. Ten years later the territory's population was only 8,500 and at two subsequent censuses, those of 1921 and 1931, only about 4,200, these figures reflecting the relatively dormant state at that time of the Yukon's mining industry. Still under 5,000 in 1941, the population increased by 85 per cent in the following decade to 9,096, the white population rising from 3,172 to 7,533 as new residents were attracted by an expanding mining industry and other developments. The future course of the territory's population will be determined largely by economic factors which cannot now be charted even broadly.

Economic Development

The course of the Yukon's economic history has been set almost entirely by the two industries, fur trapping and mining, whose production has been sufficient to require markets outside its borders. Other economic activities have been small in scale and directed solely to meeting local needs; among them are agriculture, forestry, and fishing. There is, as well, a growing tourist trade. The present and future development of these smaller industries may be examined first.

Lacking organized soil surveys, the area of the Yukon's arable land has been estimated at from 250,000 to 500,000 acres, located largely in river valleys. At present only 500 to 1,000 acres are under cultivation, principally in the vegetable gardens located in the Whitehorse, Dawson and Mayo areas, whose production is consumed locally. The Department of Agriculture maintains an Experimental Farm about 100 miles west of Whitehorse, and there investigation has been proceeding into the adaptability of crops and livestock to the conditions of soil and climate found in the territory. In river valleys such as those of the Stewart and Pelly, cattle-raising should be possible, as well as the cultivation of cereal and forage crops. The future expansion of agricultural pursuits will depend chiefly upon the Yukon's general economic development, as their products may be expected to go largely or entirely for local consumption.

The territory's forest resources have been estimated to include 45,000 square miles of forests of normal productivity, of which 10 per cent are composed of merchantable timber. The best stands are in the southeast and in valleys such as that of the Liard River, but little of this forest wealth is yet accessible to commercial exploitation. Carried on entirely to meet local needs, such as those for fuel and building materials, forest operations must await the general development of the Yukon economy for their expansion, although in time the opportunity will undoubtedly arise for the export elsewhere of limited quantities of pulpwood and other forest products.

The fish of Yukon waters, now caught principally by Indians for their own domestic uses, have not been commercially exploited, nor is there much likelihood, limited as these resources are, of the development of commercial fisheries.

The Yukon possesses a natural asset of growing importance in the attraction it exerts for visitors from other parts of Canada, from the United States and from abroad. Drawn by the territory's rugged beauty and by the pageant of the Klondike's history, and encouraged by its ready accessibility by highway, air and water, these visitors have been entering the Yukon in rapidly increasing numbers. Already a significant industry, this tourist trade may be expected to take on much more importance still in the years ahead.

Historically the first industry to produce for markets outside the territory, fur trapping continues to be a mainstay of the Yukon's Indian population. In a recent ten-year period the annual value of its catch, as measured in income to the trappers, ranged from \$144,000 to \$677,000, the wide fluctuations to which it is subject being brought on by changes both in world fur prices and in numbers of furs taken. Since of late years these values have usually failed to attain even the levels recorded in the late 1930's, they have at times represented less than one-third of the purchasing power that the industry created in the period immediately preceding the Second World War. The prices which the trappers receive for the Yukon's principal furs—muskrat, marten, squirrel, beaver and mink—have in general declined drastically. In future the problems of the trapping industry may be accentuated by competition from synthetic furs. Offering at best but an uncertain livelihood to those who pursue it, fur trapping thus cannot prudently be expected to assume, at most, much more than its present economic importance.

Out of the depressed state of this industry and the hardship it has been causing the Indian population, has come the pressing need to develop new sources of income for these people and to hasten their integration into the developing Yukon economy. While the Indians obtain much of their food and clothing from game and fish, fur trapping remains their major source of cash income. In recent years it has become increasingly apparent that this industry cannot be depended upon to provide them with even a minimum standard of living. In the past five years expenditures on relief have totalled \$111,000. To solve the Indian's economic problems and to enable him to become more and more self-supporting, the provision of larger opportunities for wage employment on either a full-time or a part-time basis is essential. Through education and vocational training, and through programs designed to facilitate his entrance into other occupations, the Indian will in future be increasingly encouraged to make his full contribution to the territory's economic progress.

Mining long ago became the industry dwarfing all others. Although its inception can be traced at least as far back as the 1880's, it was the famous gold strike of 1896 on a tributary of the Klondike River that first established mining as an important constituent of the Yukon economy. After experiencing a sharp decline in the value of its production in the early decades of this century, this industry at the outbreak of the Second World War was producing metals, chiefly gold and silver, worth \$5 millions annually. In terms of value it was then outranking fur trapping by seventeen to one. The war years saw mining fall off sharply. Since 1946, however, when its output, almost entirely of gold, was valued at \$1.7 millions, the industry has undergone an uninterrupted expansion, its production increasing nine-fold in value to \$16.6 millions in 1954.

It was Klondike gold with which this industry began. Between 1897 and 1904, inclusive, more than 100 million dollars worth was recovered from the placers of Klondike creeks, the greater part of it by primitive hand methods. This placer gold, once the preserve of individual prospectors, has more recently been recovered principally by methods requiring the use of enormous dredges and other heavy equipment. In late years gold production, chiefly from the placer creeks in the Dawson area, has ranged in value from \$2.1 to \$3.6 millions. The principal company engaged in these operations, the Yukon Consolidated Gold Corporation, has typically accounted for two-thirds of the total.

For many years the leading metal, gold has more recently given place to both base metals and silver. In 1939 it accounted for nearly two-thirds of the territory's mineral production, but in 1954 the corresponding proportion was only 17 per cent. These figures reflect the growing importance of the Mayo district as a source of silver, lead and zinc. Begun in 1913, mining in this area experienced setbacks in its early years. In 1946, United Keno Hills Mines Limited was incorporated to acquire and work available holdings, and commenced operation in December of that year. It is this company which is producing virtually all the silver, lead and zinc now coming from the Mayo district. The expansion in its operations is measured by the fact that its production, only \$425,000 in 1947, approached \$13.6 millions in 1954, including \$5.8 millions of silver, \$4.5 millions of lead, \$2.8 millions of zinc, and some cadmium. In its earlier years it was dependent upon diesel power, but the company now obtains its requirements of power from a 3,000 horsepower hydro-electric plant on the Mayo River built by the Northwest Territories Power Commission, a Crown company.

This survey of current mining operations in the Yukon may conclude with a reference to coal production. With interruptions, coal has been mined on a small scale at Carmacks for many years; annual output has recently varied from 3,000 to 16,000 tons. As the market for this coal, which in the peak year of 1954 was valued at \$225,000, may soon decline sharply, the future of this industry is problematical.

Although the Yukon mining industry has been undergoing notable expansion, it is still relatively small. Its production of metals in 1954 represented only two per cent by value of the Canadian total. What is much more significant, however, is the potential for its expansion represented by the territory's mineral wealth, to whose great promise all the facts of geology bear witness.

Future of the Mining Industry

The pace at which the territory's mineral wealth will be developed is, of course, impossible to forecast. There are, however, several factors which unite to suggest that its exploitation may well come about more quickly than is commonly supposed. One of these has been brought out most clearly by the Paley Report published in the United States in 1952. That Report foresees for the decades immediately ahead an expansion in world demand for metals and other minerals even more remarkable than the growth that this demand has undergone in years past. Taken in conjunction with the gradual depletion of more accessible supplies of many of these minerals, this increasing demand is bound in the long run to have significant consequence for the Yukon in the interest its mineral resources will attract. The territory also has the local advantage of being near enough to tidewater to permit its being made one of the most accessible parts of Canada to world-wide ocean transport. Again, the assessment of its mineral wealth has been proceeding in late years at a rate unprecedented in its history, and is expected to accelerate in future.

The tempo of recent prospecting activity has been described by Dr. H. S. Bostock of the Geological Survey of Canada. Writing of the summer of 1954, he reported that "the activity which has been developing during the last few years in the Yukon . . . grew to a boom . . . Eight or more eastern Canadian mining companies and the Geological Survey of Canada have established offices (in Whitehorse). Things have become much like the early days of the Klondike rush when new creeks were being discovered. During the summer men were seen almost daily hurrying with their packs to the plane landing at the (Whitehorse) waterfront and the bush flying pilots have been continually busy." In the summer of 1955 the exploration activity in a wide area about Whitehorse became more intensive still. The number of new discoveries lately reported each year has been impressive.

The marked attention which this Whitehorse area has received has led to the discovery of five interesting base metal deposits. Four of these are lead-zinc deposits, one northeast of the Pelly River, one northeast of Watson Lake, one near Macmillan Pass, and one on the Ketzia River. The drilling of these deposits has revealed the presence of many millions of tons of lead-zinc ore. The fifth discovery is a nickel-copper deposit near Kluane Lake which has been the object of much underground development work. Many other prospects—of silver-lead, lead-zinc and copper—have been found, particularly in the Canol Road and Pelly River areas. In addition, asbestos has recently been discovered a few miles west of the Canol Road.

In central Yukon interesting deposits of copper and lead-zinc have been discovered in an area 80 miles north of Keno, and a showing of asbestos has been found 40 miles northwest of Dawson. Farther north, a large area lying astride the Arctic Circle is at present under investigation for its potential as a bearer of oil and natural gas. This area, nearly 12,500 square miles in extent, is covered by what are known as the Eagle Plain reservation and half of the Peel Plateau reservation, which extends across the border into the Northwest Territories, and by oil exploration permits. Since 1952 the company surveying this area has been undertaking general geological work and last year

commenced a seismic survey that is to be completed early in 1956. For the region still farther north, along the Arctic Coast, much future exploration for oil has been prophesied since oil has been discovered in the neighbouring area of Alaska.

What the recent discoveries of the territory's mineral wealth have in common is that their exploration has not yet advanced far enough to allow a conclusive judgment on the prospects for their commercial development. They exemplify the fact that the discovery of a promising mineral deposit must often be followed by years of exploration designed to prove the size and grade of the orebody and, if then justified, by a further period devoted to preparing the property for production. For the very reason that the current surge of exploration activity in the Yukon is of relatively recent origin, it would be premature to attempt to forecast even the expansion that the mining industry will undergo in the years immediately ahead.

If this consideration applies to the promising discoveries already made, it applies more strongly still to the widespread search now going on for deposits as yet unknown. The combination, however, of the highly mineralized area that the Yukon presents and the growing search for, and assessment of, its wealth, gives good grounds for anticipating a relatively early addition to its producing mines. To look farther ahead, it may fairly be concluded that this same combination of factors, operating over a period measured in decades, will bring about an expansion in the territory's mining industry important not only to it but to Canada as a whole. It would seem, moreover, that the rising trend in the world's demand for metals and other minerals should not only give increasing encouragement to the search for the Yukon's mineral wealth but also have the effect, in the long run, of adding to the commercial attractiveness of any given mineral deposit. The development of even a relatively small number of new mining properties could add substantially to the territory's importance as a mineral producer.

The prospect now is that the Yukon's mining industry will gain early encouragement from an important development of another of the territory's natural resources, its water-power. In the headwaters of the Yukon River and certain of its tributaries is contained the potential for the ultimate production of roughly 4,500,000 horsepower of electrical energy, or about one-quarter of the hydro-electric capacity now developed in all of Canada. An investigation of the feasibility of harnessing this power is now under way. Under this project power plants proposed for the Taku River in northern British Columbia would produce energy which, while finding its chief markets in the electrometallurgical and electrochemical processing of ores brought in by sea, would also be available for the region's mining industry. In itself this development could give valuable stimulus to the economy of the southern Yukon. A large proportion of the water used in the development of power in British Columbia would come through the diversion of water from the Yukon.

The territory is already the site of three waterpower developments which, though relatively small in horsepower, play important roles. Of these the largest is operated by the Yukon Consolidated Gold Corporation on the North Fork of the Klondike River. With a capacity of 15,000 horsepower, this plant not only supplies the power required

in the company's placer mining operations but also serves the city of Dawson. The 3,000 horsepower development on the Mayo River has already been mentioned. Finally, the Yukon Hydro Company Limited has an installed capacity of 1,390 horsepower at Porter's Creek, and it is from this plant that nearby Whitehorse obtains its electricity.

Whatever growth of manufacturing industries the Yukon may witness in the next quarter-century will largely be associated with mining developments. The base metals now produced at Mayo are reduced to concentrates before they are shipped. The territory could in future be the site not only of concentration plants but also of smelters, depending upon the character of new mining operations and upon the availability of low-cost power.

IV. PROBLEMS OF ECONOMIC DEVELOPMENT

The economic expansion of the Yukon has been and will continue to be affected by the limits imposed and the problems created by the factors of transportation and climate. Of the two, climate is much the lesser factor.

Climate

The climate of the Yukon Territory is commonly supposed to be sterner than it actually is. Along with large parts of the provinces the Yukon, its northern extremity excepted, is classified as a subarctic rather than an arctic region. Although the Yukon winter is characteristically rigorous and long, its severity is easily exaggerated. Average daily mean temperatures in January, the coldest month of the year, are little different in the southern Yukon from those reported for Winnipeg and Saskatoon. A broader and more revealing comparison is furnished by average daily mean temperatures throughout the five coldest months of the year, November through March. The average for Whitehorse at 10 degrees above zero is the same as for Saskatoon and one degree warmer than for Winnipeg. In the Mayo mining district the average at 2 below is only 6 degrees colder than at the mining centre of Flin Flon, Manitoba. It is in length of winter that such comparisons become less favourable to the territory. The average frost-free periods of 78 days at Whitehorse and 64 days at Mayo stand in sharp contrast to 112 days at Saskatoon.

The Yukon summer, though short, is pleasantly warm. The average daily mean temperature in July at Mayo is 58 degrees, only seven and eight degrees lower than those reported for Saskatoon and Flin Flon respectively. More noteworthy is the fact that for the period from June through August the corresponding differences in temperatures are much the same. Precipitation, as both snow and rain, is generally light.

The economic significance of the territory's climate has several facets. In part by its dictates the resources of workable agricultural and forested lands are relatively limited. Because economic expansion will depend largely on the development of the Yukon's massive mineral wealth, the impact of climate on the mining industry is of special interest. Climate adds to this industry's costs in several ways. At properties in the production and pre-production stages it limits the season and increases the cost of certain types of construction and development work, and for new mines has the effect of lengthening their preproduction period with its attendant costs. It likewise adds to heating costs, to an extent which may be provisionally measured from data on degree-days of heat. By definition, for any one day when the mean temperature is less than 65 degrees, this temperature being selected as the base, there are as many degree-days as there are Fahrenheit degrees difference in temperature between the mean temperature for the day and 65 degrees. Annual totals of these degree-days broadly measure annual heating requirements. On this basis, heating costs at Mayo are 50 per cent higher than in the Sudbury mining district and 15 per cent higher than at Flin Flon. Again, climate acts to add to the wage bills of mining operations. While it is not possible to establish the significance

that these costs assume in total, it is clear that they do represent a burden for the mining industry. They do not offer, however, a serious physical problem for this industry's economic development.

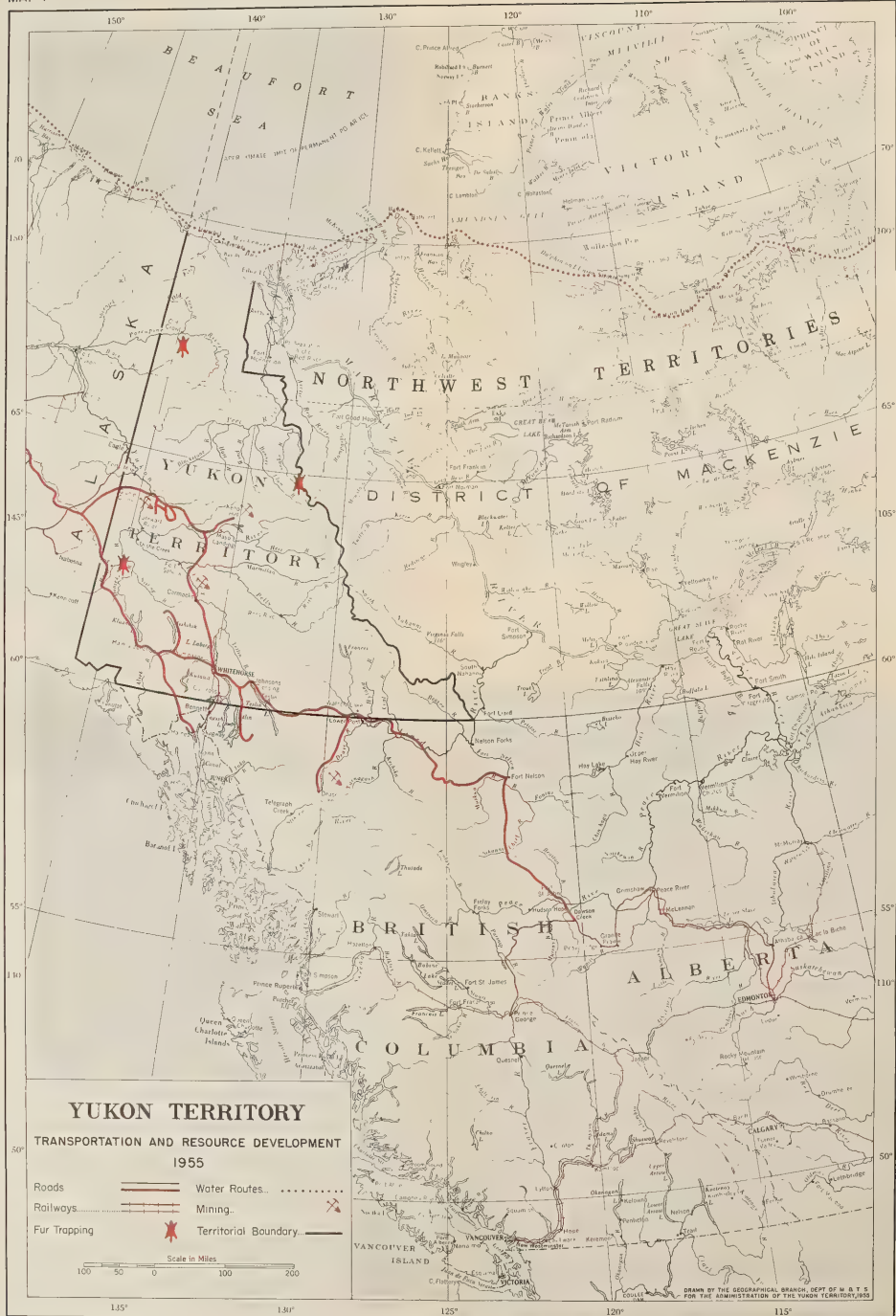
Transportation

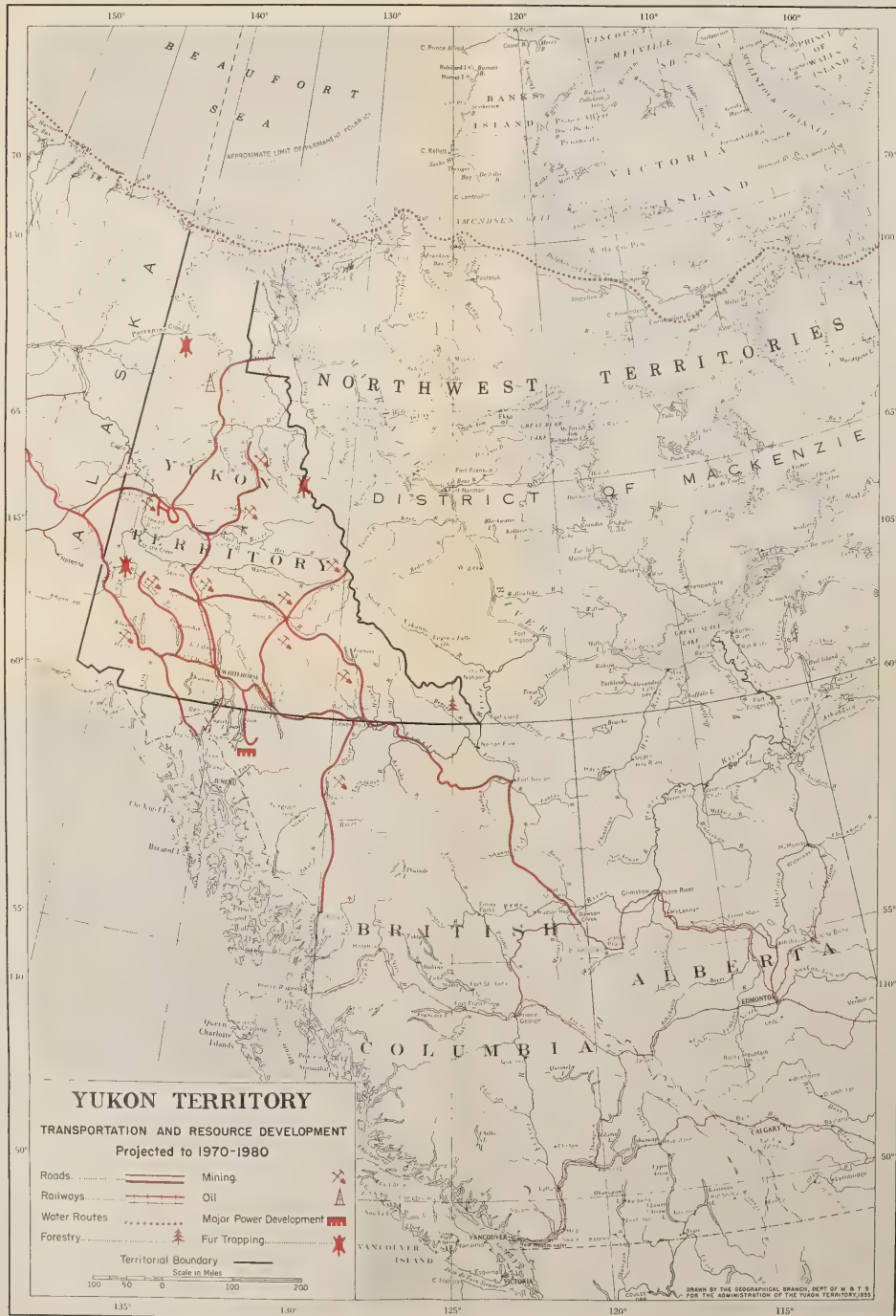
It is transportation which stands with the progressive assessment of the Yukon's mineral wealth as a great key to, and determinant of, the territory's economic expansion. The problem it presents is two-fold, involving both the level of transportation costs and the adequacy of transportation facilities. That the territory's transportation costs are high is due to several factors: the distances from markets and sources of supply, especially those in eastern Canada; the limited volume of traffic supported by the present Yukon economy; the lack of balance between inward and outward freight movements; and the pattern of the territory's transportation facilities. These facilities have in late years undergone substantial expansion, but along with transport costs their relative scarcity goes far to explain the limited economic progress yet made by the Yukon. They still impose serious limits on the exploration and development of its natural resources.

The earliest transportation routes were those provided by Yukon River and its tributaries. In the wake of the Klondike gold rush construction of the White Pass and Yukon Railway was completed in 1900, and this 110-mile, narrow-gauge railway from Skagway, Alaska, to Whitehorse continues to link the territory with ocean shipping, which moves through the Inside Passage off Alaska and the coast of mainland British Columbia. Until recent years the White Pass and Yukon Route operated steamers along the Yukon and Stewart Rivers to serve the communities along their courses.

Before the Second World War the only roads in the Yukon were those to be found in settlements and about mining properties. The complete dependence of most of the territory upon water transportation was to be lessened first by the wartime construction of the Northwest Highway System, built as a defence measure in the conflict with Japan. Of this system the most important element is the Alaska Highway, which was completed in 1943 and which, in its 1,523 mile course from railhead at Dawson Creek, British Columbia, to Fairbanks, Alaska, runs for 586 miles in the Yukon from Watson Lake through Whitehorse and thence to the Alaska boundary. If this highway had been built for economic reasons it might have followed a different route, but it has nevertheless played an important economic role, not least in the stimulus it has given to the exploration of the mineral wealth in the areas along it. It is maintained by the Department of National Defence and is open to traffic throughout the year. The Northwest Highway System also includes the Yukon portion, 65 miles in length, of the Haines Cutoff, which traverses the 117 miles from the port of Haines, Alaska, to Haines Junction on the Alaska Highway west of Whitehorse. This highway is open to traffic only in the summer, as its costly winter maintenance is not justified by its economic importance.

Transportation by water not only confined the mineral development of the Yukon to areas adjacent to the river routes, but it also had disadvantages which went far to cancel out its inherent cheapness. Because the navigation season on the Yukon River system





is at most five months long, dependence on water connections involved the storage of large inventories, many of them requiring to be heated, and the costly stockpiling of mine products. Moreover, it became apparent after the war that this traditional mode of serving the central Yukon could not handle the substantially increased traffic that the territory's mining development had created unless heavy capital expenditure were made on new equipment. It was for these reasons that the federal government constructed, at a cost of \$4,454,000, the 247-mile highway which since 1950 has run from Mayo, the site of the Yukon's most important mining enterprise, to a junction with the Alaska Highway near Whitehorse. Among the merits this highway possesses is that of being short enough, in comparison with the original water route, to offset the advantage that the latter enjoyed in its lower costs per mile of freight carriage. It has done much to encourage the expansion that the Mayo mining district has lately undergone. The opening in 1954 of a branch highway from Stewart River Crossing has given the city of Dawson similar connections with the south. In consequence of this highway building the water routes have been superseded as arteries of commerce.

The improvements which the past decade and more have brought in the Yukon's transportation facilities have a further importance. Because the territory is dotted with few lakes, the prospector dependent upon transportation by air does not enjoy the advantages which the myriad lakes of the Precambrian Shield offer his counterpart in the Northwest Territories and elsewhere in Canada. Instead, the sweep of his activities is governed much more by the presence or absence of highway facilities. This is so even when he uses helicopters, because their limited range requires that stores of gasoline be set down in many places. The role that highways can play in the encouragement of mining exploration is given striking illustration in the developments currently centering about the Alaska Highway.

In surface transportation remains the main problem facing the Yukon's economic expansion. Just as the extension of these facilities will serve to open up its mineral wealth, so will it serve to reduce transportation costs by creating larger volumes of inbound and outbound freight. Some of the territory's most promising areas remain wholly inaccessible, entirely denied the advantages afforded by the Yukon's great asset of being near to tidewater. The means of transport already in existence in the territory could gain much further importance from the construction of branch highways at relatively small cost. The Yukon will necessarily remain under a comparative disadvantage as to certain components of its transportation costs, in particular those arising out of its remoteness from certain markets and sources of supply. However, the reduction in costs in the territory itself that a finer network of modern transportation facilities would bring about as it promoted the Yukon's economic expansion could substantially diminish the transportation problem. The measure of the significance that such a network could assume is found in the Yukon's massive mineral potential, in the importance that base metals and other minerals have for Canada's export trade and for our economy generally, and in the world's growing need of these materials. More than anything else, it would encourage that development which could well make a significant contribution to the Canadian economy of the next quarter-century.

V. PROMOTION OF FUTURE ECONOMIC DEVELOPMENT

The first objective of this brief has been to assess the contribution that the natural resources of the Yukon Territory might make to the Canadian economy of the next quarter-century. In the course of this assessment the Yukon has been shown to possess mineral wealth whose development could be important not only to it but to Canada as a whole. This brief accordingly has as its second objective the examination of means whereby the territory's progress toward the realization of its potential could be quickened.

What has become most apparent is the stimulus to economic expansion that a substantial reduction in the problems and costs of Yukon development could afford. It is primarily to the federal government that the territory looks for the adoption of policies designed to reduce the disadvantages under which its economy now functions. That is, in the first place, because the resources of the Yukon remain vested in the Crown in the right of Canada. That is not the situation in the provinces. The reason for the difference in treatment is the recognition that, at this stage of its development, the Yukon is not in a position to take the measures that would best assist in the development of the resources. The people of the Yukon, however, properly regard these resources as being held for the benefit of the Yukon of the future. The basic reason for the vesting of the resources in the federal government is, I submit, the justification for looking to the federal government for the measures that will bring about their largest development. The second reason for looking to the federal government is that the courses open for the lessening of the burdens on the Yukon economy would appear to lie chiefly in larger federal responsibility for the provision of transportation facilities, in the grant of federal tax concessions to new mines in northern Canada, and in having the development of the territory's water-power resources redound to its fair benefit. The basis on which these courses may be urged I shall set forth in preface to each of the three proposals which, if I may, I should like to submit to this Royal Commission for its consideration.

Roads

The crucial importance of highway transportation to the Yukon has already been brought out. The financial responsibility which the several levels of government accept at present for the construction and maintenance of roads in the territory follows the recommendations made in the "Report on Yukon Territory" issued in 1952, after study at the federal level, by an Interdepartmental Committee on Territorial Financial Problems. After recommending that all roads to be constructed in the territory should be classified as "resource", "trunk" or "secondary", this Report went on to recommend that financial responsibility for the first two classes should be borne as follows:

"Resource" roads would be those deemed essential to the effective exploitation of some natural resource. The capital and maintenance costs of such roads should be borne by the federal government and any interested private company, under agreements made for specific cases, in advance of construction.

"Trunk" roads would be those connecting various settlements. Responsibility for construction and maintenance costs of these should be borne by the Territorial Government, unless in a specific case the federal government agrees to pay a portion of the construction and/or maintenance costs because the road contains some resource road element. The justifiable amount of the federal contribution, if any, will vary in each case, depending on the extent to which the road contains resource characteristics.

The distinction between "resource" roads and "trunk" roads has in many areas a good deal of validity, but in the Yukon it can be misleading. The roads which link a new or a promising mining area with established settlements or communication routes are precisely those which loom as most important for the development of the territory's economic potential. Yet, roads of this type could easily be classified as "trunk" roads. Since the ownership of the Yukon's resources is vested in the federal government, it appears to the people of the Yukon only reasonable that the cost of such roads should be borne by the federal government alone. Long and costly as they usually are, these roads constitute a responsibility which the Territorial Government, limited in its finances, cannot possibly assume to the extent that the development of the Yukon's resources requires. It might then be more appropriate to abandon the designation "trunk" road and call these instead by some such term as "resource development" roads.

On these grounds it is, therefore, submitted that it might not be unjust to suggest that the federal government should bear the entire costs of constructing "resource development" roads. Recognizing, however, that once built they will carry limited traffic not directly arising from resource development, the Territorial Government and, I feel sure, the people of the Yukon, would recognize the appropriateness of their assuming a proportion of maintenance costs that would have realistic regard for the limited financial capacity of the territory.

The requirements that the next 25 years may bring for the construction of roads are given illustration in those roads which even now would form highly useful adjuncts to the territory's system of development roads. These are drawn in on Map No. II accompanying this brief. Development would appear to call first for the construction of a road from Carmacks eastward to Ross River designed to open up an area seemingly rich in lead and zinc. As that area developed, it would appear likely that the occasion could then arise for the repair of the Canol Road, first from the Alaska Highway to Ross River and then on to the Northwest Territories border, to serve an area also known for its lead and zinc. To the southeast a road from Watson Lake north to Frances Lake and thence northwest to Ross River would pass through a promising mineral region. Were the Ross River area to become the site of a large metals production, Carmacks could become a focal point for the traffic in concentrates originating both there and at Mayo. Indeed, Carmacks might also eventually become railhead for the White Pass and Yukon Route, and perhaps the site of an electrolytic refinery utilizing such low-cost power as may be located in the territory. In the southwest the road that now runs from the Alaska Highway to Aishihik Airport could well be extended in a northwesterly direction to tap the mineral wealth believed to be located there. Elsewhere in the Yukon, the discovery of oil in the area about the

Arctic Circle could bring the construction of a road originating near Dawson and ending at Fort McPherson in the Northwest Territories after turning eastward and passing through the Richardson Mountains. The importance of such developments for Dawson and the northern region of the Yukon is apparent. Again to the north, a further road might proceed from Keno down the Wind River, opening up a region thought to be promising for both base metals and certain rarer metals of strategic importance.

Although these appear now as the greatest needs that the foreseeable future holds for the construction of roads in the territory, the succession in which they may be built is by no means certain, nor is it unlikely that the priority given each individual road will undergo substantial revision. They nevertheless point to the significance that the provision of further roads will have for the developing Yukon economy.

Tax Exemptions

For both new and established mines, location in the Yukon, as well as elsewhere in northern Canada, involves costs unmatched by those which face mines situated farther south. In the territory these higher costs consist chiefly of freight charges on incoming and outgoing freight, the remuneration of employees that a higher cost of living requires, and the need for additional heating that a cold climate creates. There are problems, too, which go to increase both the time and the cost of bringing new mines into production; among them is the common necessity of building road links to the nearest highway route, and the shorter construction season allowed by the climate. Because it takes longer and costs more to prepare a mine for production in the Yukon, a company undertaking such a venture often finds it difficult to raise large capital sums by the sale of common stock. One result is that once the mine is in production, it may for several years have to fall back on highgrading as the means for securing profits by which it can finance its expansion.

The need on the part of a new mine in a remote area to plough back capital may extend well beyond the expiry date of the present three years' exemption from federal corporation income tax granted to new mines regardless of their location. When tax payments increase the press on available funds, dividends may suffer, and with them the company's chances of raising capital by a stock market issue.

For these and other reasons, it has been suggested that the period of tax exemption for new mines in the Yukon, along with other remote areas, might well be extended to a maximum of perhaps six or seven years. Admittedly the definition of a "remote area" poses difficulties which cannot entirely be resolved. A system whereby the length of the tax-exempt period for each mine would be determined by the parallel of latitude of its location, would appear to offer the best solution to this problem, particularly if the relief it offered were placed on a graduated scale. Thus for latitudes immediately north of the 55th parallel the exemption period might be raised from three to four years, with progressive increases thereafter up to a maximum of seven years for extreme northern latitudes.

Such a system would avoid a complicated formula to distinguish between mines adjudged to be in remote areas and those not. It would likewise not have to contend with the enormous difficulties of decision that the consideration of each case on its merits would involve. Finally, it may be pointed out that there would be a measure of realism in such a system, and not simply a measure of assistance to northern development. It is an undeniable fact that, in general, the season of construction and outdoor work becomes shorter as one moves north. Because of that, and because of the delays that distance and inadequate transportation create, three years do not represent, in the north, the same time for the actual work of development that they do in the south. If three years is a fair and reasonable period in the south, four, five, six or seven years would appear to be no more than the fair equivalent in the north.

Water-power Development

Present prospects indicate that the enormous hydro-electric potential contained in the waters of the Yukon River and certain of its tributaries will be harnessed for the production of power from plants located along the Taku River in northern British Columbia. Under this program not only will the dams required for the diversion of waters be located in the Yukon, but something like half the water to be finally utilized will come from the territory. Furthermore, almost all the water involved would, unless diverted, flow through the Yukon and be available for whatever use the territory wished, whether for the development of power or for other purposes.

Taking into account the significance that its water-power resources could assume for the territory's economic expansion, it is the view of the government of the Yukon that the Yukon can properly expect to be granted an equitable share of the water rentals accruing from the use of these waters and to be guaranteed the provision of a substantial block of the power to be drawn upon once its demand becomes large enough to render the transmission of such power to the Yukon economic.

VI. CONCLUSION

There are of course many other matters which will have an important bearing on the economic development of the Yukon: some with special significance for particular communities, others of general significance but of somewhat lesser importance than those to which I have just referred. This brief has restricted itself to matters of major importance and long-term significance, but the oral representation may provide the opportunity for enlargement as the Commission may desire. It is my hope, however, that within this brief compass I have been able to convey something of the capacity of the Yukon to contribute to the future wealth of Canada. '

APPENDICES

Appendix A

Geology and Mineral Prospects of the Yukon Territory

By H. S. BOSTOCK, *Geological Survey of Canada.*

The central feature of the triangular Yukon Territory is the basin-like Yukon Plateau. The southeast and north corners of the triangle are occupied by smaller basin-like areas around the Liard and Porcupine Rivers respectively. The Yukon Plateau and these minor basins are rimmed and separated from each other by mountain barriers, and mountains interrupt the relatively even surface of the Yukon Plateau.

The Plateau is mainly a platform of old altered rocks. Hollows in the surface of these rocks are filled by Palaeozoic and Mesozoic sedimentary and volcanic strata and the whole complex is invaded by many varieties of intrusive rocks. Tertiary sedimentary and volcanic rocks rest on all these earlier rocks. One of the largest hollows in the old rocks is the trough of Mesozoic strata called the Laberge syncline.

North, northeast and east of the Plateau, the Ogilvie and Selwyn Mountains are largely of Palaeozoic sedimentary strata invaded by small scattered intrusions in their borders near the Plateau. The Coast Mountains project northward into the Yukon. Their rocks are similar to those of the Plateau but a core of granitic intrusions is their dominant feature. In the southwest corner of the Territory the St. Elias Mountains are mainly composed of Palaeozoic and Mesozoic sedimentary and volcanic rocks, invaded by a variety of small intrusions along the northeast front and by larger intrusions in their interior. In addition, areas of Tertiary sedimentary and volcanic rocks occur in the northeast flank of these mountains.

In the southeast, the basin of the Liard River is mainly Palaeozoic sedimentary rocks with patches of Tertiary sedimentary and volcanic rocks lying on them.

In the north, the basin of the Porcupine River contains a great thickness of marine and continental sedimentary strata ranging in age from late Precambrian to Tertiary. Around the basin the British and Richardson Mountains are composed mainly of the lower strata of the basin, but in the Northwest some intrusions as well are present. Southeast of the Richardson Mountains the Yukon includes an area of plateau containing rocks similar to those of the Porcupine basin but many thousands of feet thinner in thickness.

The whole of the Yukon Territory is a region where mountain structures are characteristic. The only part where large, gentle, open folds occur in it is in the Porcupine basin.

Most of the region north and west of Carmacks escaped glaciation in Pleistocene time.

The varied geology of the Yukon Territory promises a wide range of mineral resources and a large assortment have been discovered. Gold, silver, coal, lead, zinc, cadmium, copper, tungsten, platinum, and antimony have been produced. Deposits containing nickel, platinum group metals tin, iron, asbestos, gypsum, monazite, molybdenum, arsenic, various salts, bitumin and natural gas, peat, fluorite, bismuth and pumice are known and others such as iceland spar and optical quartz crystals have been reported.

During the 19th century and the first decade of this century the Territory was well prospected for gold placers but except for the coal near Carmacks, little attention was paid to other deposits. The discovery in the second decade that the lead veins in the Mayo District carried high silver values and could be mined profitably brought a wave of prospecting for high-grade deposits but it was only after the last war that general prospecting with adequate capital really developed.

The search for placer gold was thorough and it is unlikely that important new gold placers will be discovered now though some lesser deposits of this type continue to be found from time to time. The favourable geology and lack of glaciation to which the gold placers owe their origin and preservation, however, remain in the unglaciated area and make it a promising field for the search for placers of other heavy minerals including gem stones. The presence of tungsten, tin, monazite, and zircon found incidentally in the gold placers support this idea, but no serious attempt has been made to test it.

At the present, a wide search is in progress for minerals over the whole territory but the Pelly and St. Elias front regions are receiving most attention due to the recent discoveries made in them. In both these two regions the geology is particularly promising for base metal prospecting.

In the Pelly region many scattered granitic stocks intrude late-Precambrian and Palaeozoic sedimentary rocks and mineralized zones have been found around them. The region stretches 500 miles from near the Alaska Highway in the southeast to beyond Mayo. Three large drilled lead-zinc-silver deposits have been found in recent years as well as many unproved discoveries scattered from end to end of it. The discoveries of all three major deposits and indeed all the original finds were of exposed mineral and no laborious tracing of float or trenching was necessary to find them. These factors show the widespread mineralization in this great region and its relatively unprospected condition so that it can be looked upon as a most promising mining region for the future.

In the St. Elias region the geology is most likely to contain copper and nickel as these are commonly associated with the basic rocks that are present among its intrusions. This is supported by the copper nuggets generally formed in the placer creeks in it by the platinum found in some creeks and also by a number of nickel-copper sulphide lodes discovered in it during recent years. The great Kennecott deposit of Alaska now mined away lies in the westward continuation of this region. In addition, it contains at least one large gypsum deposit and several small basins of soft coal, low in ash. The northeast front of the region is one of the most accessible for development in the Yukon by reason of the Alaska Highway and Haines Cutoff Road.

While these two regions are receiving and appear to deserve the most attention there is no part of the Yukon Plateau and its surrounding mountains that has not had some notable mineral discovery made in it so that the whole southern two thirds of the territory has great potential mineral resources.

The coal deposits of the Territory lie in late Mesozoic and in Tertiary sedimentary rocks. The Laberge syncline contains a number of basins of coal measures of late Mesozoic age believed to have similar coals to those of the Crowsnest Pass. Bituminous coal has been mined from seams in these measures near Carmacks since 1900 where the mines are close to the river transport and now the road from Whitehorse north. Though a number of other larger basins than those near Carmacks are known, none have been examined or had their coals analysed. The likelihood of there being large reserves of coal is apparent and the chance that some of the seams are of coking coal as in the Crowsnest is probable.

The Tertiary coals are soft but generally low in ash. They occur generally in small basins but they have been found for a distance of nearly 80 miles in the Tintine valley north of Dawson. There was a little mining of this coal.

The Liard region holds possibilities for oil and may contain both Mesozoic and Tertiary coals.

Oil seems to be the likely major resource of the Porcupine basin region as it contains all the necessary factors. Bitumin veins, gas seepages and a thick section of marine strata containing excellent source and reservoir rocks as well as good reservoir structures have been found there. Large deposits of Mesozoic and Tertiary coal may be present in it. Coal has been mined on a small scale at the west edge of the Mackenzie Delta. Small gold and tungsten placer and lode deposits occur in the northern part of the region. As a whole, the resources of the Porcupine basin region have been explored even less than those of the main part of the Yukon.

Appendix B

POPULATION OF THE YUKON TERRITORY, 1901-1951

Year	Total	Whites	Indians	Eskimos
1901	27,219	23,897		3,322
1911	8,512	7,023		1,489
1921	4,157	2,767	1,390	85
1931	4,230	2,602	1,543	—
1941	4,914	3,172	1,701	—
1951	9,096	7,533	1,533	30

SOURCE: Dominion Bureau of Statistics.

Appendix C

VALUE OF MINERAL PRODUCTION IN THE YUKON TERRITORY Showing Volume and Value of Principal Minerals, 1939-1954

Year	Total value of mineral production	Gold		Silver		Lead		Zinc	
		Ozs.	\$000's	'000 Ozs.	\$000's	'000 lbs.	\$000's	'000 lbs.	\$000's
1939	4,961	87,745	3,171	3,831	1,551	7,545	239	—	—
1940	4,118	80,458	3,098	2,259	864	4,656	157	—	—
1941	3,118	70,959	2,732	857	328	1,704	57	—	—
1942	3,454	83,246	3,205	482	203	1,322	44	—	—
1943	1,626	41,160	1,585	52	24	196	7	—	—
1944	939	23,818	917	32	14	106	5	—	—
1945	1,239	31,721	1,221	25	12	120	6	—	—
1946	1,694	45,286	1,664	31	26	52	4	—	—
1947	2,096	47,745	1,671	372	268	1,145	157	—	—
1948	4,266	60,614	2,121	1,719	1,289	4,599	830	—	—
1949	5,099	81,970	2,951	1,563	1,160	5,356	846	847	112
1950	9,036	93,339	3,552	3,203	2,588	12,886	1,862	5,507	862
1951	9,793	77,504	2,856	3,443	3,255	12,533	2,306	5,679	1,130
1952	11,386	78,519	2,691	4,029	3,365	18,369	2,974	11,070	1,933
1953	14,569	66,080	2,274	6,639	5,578	31,591	4,083	18,027	2,156
1954	16,589	82,808	2,801	6,992	5,822	33,766	4,501	23,646	2,833

SOURCE: Dominion Bureau of Statistics.

Appendix D

COMPARATIVE CLIMATIC DATA: AVERAGE DAILY MEAN TEMPERATURES IN SELECTED MONTHS, FOR SPECIFIED LOCATIONS IN THE YUKON TERRITORY AND ELSEWHERE IN CANADA

Location	Years of observation	January	July	November- March	June- August
Yukon					
Whitehorse	10	5	56	10	55
Watson Lake	12	- 7	59	2	57
Mayo Landing	26	-11	58	- 2	56
Dawson	30	-16	60	- 6	58
N.W.T.					
Yellowknife	10	-18	60	- 8	57
Port Radium	11	-15	54	- 7	51
Quebec					
Chibougamau	14	- 3	61	8	58
Knob Lake	5	-13	55	1	52
Ontario					
Porquis Junction	12	1	64	11	61
Sudbury	16	10	66	18	64
Manitoba					
Winnipeg	66	- 3	67	9	64
Flin Flon	23	- 7	66	4	62
Saskatchewan					
Saskatoon	38	- 1	65	10	62
Alberta					
Edmonton	56	6	62	16	60

SOURCE: Meteorological Division, Department of Transport.

Ex 52 in Briefs

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